Compound 1a: colourless oil. **IR:** 2963, 1719 cm^{-1}. **^{1}H NMR** (δ): 0.89 (s, 3H), 0.90 (s, 3H), 1.35 (s, 3H), 2.26 (s, 3H), 2.47 (s, 1H), 2.99 (m, 1H). **^{13}C NMR** (δ): 21.4, 24.5, 25.7, 29.1, 29.9, 30.8, 31.2, 56.2, 58.5, 61.9, 207.6. ***m/z*(EI):** 182 (1, M^+), 111 (29), 107 (100), 91 (30), 84 (56), 69 (59), 55 (76). Anal. cald. for $C_{11}H_{18}O_2$: C, 72.49, H, 9.95. Found: C, 72.56, H, 10.00.

Compound 9a: colourless oil. **IR:** 2922, 1711 cm^{-1}. **^{1}H NMR** (δ): 0.89 (s, 3H), 0.90 (s, 3H), 1.56 (br s, 3H), 2.15 (s, 3H), 2.71 (br s, 1H), 5.56 (br s, 1H). **^{13}C NMR** (δ): 22.50, 23.02, 27.57, 27.75, 30.92, 31.75, 31.86, 64.37, 123.28, 130.22, 210.95. ***m/z*(EI)**: 166 (31, M^+), 123 (94), 109 (19), 91 (39), 81 (100), 67 (32), 53 (28). Anal. cald. for $C_{11}H_{18}O$: C, 79.46, H, 10.91. Found: C, 79.32, H, 10.88.

Compound 1b: colourless oil. **IR:** 1721 cm^{-1}. **^{1}H NMR** (δ): 0.81, (s, 3H), 0.82 (s, 3H), 1.22 (s, 3H), 2.97 (t, J=2 Hz, 1H), 9.55 (d, J=4.8 Hz, 1H). **^{13}C NMR** (δ): 21.26, 24.17, 26.20, 27.60, 28.85, 29.93, 56.78, 57.24, 59.07, 203.00. ***m/z*(EI):** 168 (40, M^+), 149 (43), 139 (36), 121 (35), 99 (32), 84 (35), 67 (15), 55 (100). Anal. cald. for $C_{10}H_{16}O_2$: C, 71.39, H, 9.58. Found: C, 71.53, H, 9.42.

Compound 9b: white solid m.p.=115-120 ºC. **IR:** 3268, 2924 cm^{-1}. **^{1}H NMR** (δ)**:** 0.69 (d, J=3.4 Hz, 1H), 0.98 (s, 3H), 1.05 (s, 3H), 1.27 (s, 3H), 3.44 (d, J=3.4 Hz, 1H), 3.88 (t, J=6 Hz, 1H). **^{13}C NMR** (δ)**:** 27.65, 27.77, 29.00, 29.65, 30.26, 31.99, 34.59, 40.96, 54.47, 71.95. ***m/z* (EI):** 170 (6, M^+), 152 (10), 149 (100), 123 (23), 109 (91), 95 (24), 81 (50), 74 (45), 59 (87), 55 (53). Anal. calcd. for $C_{18}H_{22}O_2$: C, 70.55, H, 10.66. Found: C, 70.71, H, 10.45.

Compound 2a: colourless oil. **IR:** 1717 cm^{-1}. **^{1}H NMR** (δ): 0.67 (s, 3H), 0.89 (s, 3H), 1.25 (s, 3H), 2.19 (s, 3H), 2.47 (dd, J=6.4, 17.6 Hz, 1H), 2.53 (dd, J=5.6, 18 Hz, 1H), 2.98 (br s, 1H). **^{13}C NMR** (δ): 21.78, 24.86, 26.84, 27.01, 27.21, 30.61, 30.82, 41.55, 41.58, 60.25, 60.76, 209.05. ***m/z*(EI):** 196 (26, M^+), 183 (25), 149 (58), 135 (25), 109 (41), 97 (100), 81 (60), 74 (75), 59 (25). Anal. calcd. for $C_{12}H_{20}O_2$: C, 73.43, H, 10.27. Found: C, 73.21, H, 10.35.

Compound 10: colourless oil. **IR:** 3447, 1715 cm^{-1}. **^{1}H NMR** (δ): 0.74 (s, 3H), 0.94 (s, 3H), 2.16 (s, 3H), 2.64 (m, 2H), 4.08 (m, 1H), 4.55 (s, 1H), 5.09 (s, 1H). **^{13}C NMR** (δ): 21.60, 29.09, 30.20, 32.26, 34.99, 37.20, 41.83, 46.80, 72.92, 105.71, 150.76, 208.85. ***m/z*(EI)**: 178 (7, M^+-H_2O), 163 (6), 139 (47), 123(54), 107 (37) 81 (43), 69 (37), 55 (100).Anal. calcd. for $C_{12}H_{20}O_2$: C, 73.43, H, 10.27. Found: C, 73.55, H, 10.09.

Compound 10a: white solid m.p.= 160-170ºC. **IR:** 3362, 1377, 1045 cm^{-1}. **^{1}H NMR** (δ): 0.82 (s, 3H), 0.93 (s, 3H), 1.20 (s, 3H), 1.43 (s, 3H), 3.75 (dd, J=8.6, 6.4 Hz, 1H). **^{13}C NMR** (δ): 10.55, 21.08, 21.17,

30.19, 30.88, 31.71, 37.96, 41.52, 43.83, 52.11, 73.72, 76.21. ***m/z*(EI)**: 198 (15, M^+), 181 (14), 149 (12), 123 (30), 107 (30), 96 (84), 81 (39), 69 (52), 55 (100). Anal. cald. for $C_{12}H_{22}O_2$: C, 72.68, H, 11.18. Found: C, 72.70, H, 11.26.

Compound 2b: colourless oil. IR: 1724, 1090 cm^{-1}. **^{1}H NMR** (δ): 0.68 (s, 3H), 0.88 (s, 3H), 1.26 (s, 3H), 2.50 (m, 2H), 2.98 (s, 1H), 9.86 (s, 1H). **^{13}C NMR** (δ): 21.68, 24.87, 27.00, 27.05, 27.30, 30.88, 41.49, 42.42, 59.71, 60.57, 202.76. ***m/z*(EI):** 182 (36, M^+), 165 (34), 157 (28), 139 (32), 123 (41), 109 (26), 95 (51), 83 (66), 69 (68), 55 (100). Anal. calcd. for $C_{11}H_{18}O_2$: C, 72.49, H, 9.95. Found: C, 72.60, H, 10.02.

Compound 10b: white solid m.p.= 60-65ºC. **IR:** 3370, 1289 cm^{-1}. **^{1}H NMR** (δ): 0.82 (s, 3H), 0.88 (s, 3H), 1.17 (s, 3H), 3.70 (dd, J=7.9, 7 Hz, 1H), 4.28 (m, 1H). **^{13}C NMR** (δ): 21.42, 27.12, 27.36, 29.28, 30.26, 31.21, 33.29, 45.98, 46.35, 66.10, 72.78. ***m/z*(EI)**: 184 (15, M^+), 165 (14), 153 (12), 125 (18), 111 (17), 95 (29), 81 (37), 69 (54), 55 (100). Anal. cald. for $C_{11}H_{20}O_2$: C, 71.69, H, 10.94. Found: C, 71.51, H, 11.05.

Compound 10b$_1$: white solid m.p.= 100-110ºC. **IR:** 3318, 1024 cm^{-1}. **^{1}H NMR** (δ): 0.81 (s, 3H), 0.92 (s, 3H), 1.11 (s, 3H), 3.58 (dd, J=5, 2.6 Hz, 1H), 3.74 (dd, J=6.7, 3.8 Hz, 1H). **^{13}C NMR** (δ): 8.98, 21.33, 29.30, 30.57, 31.72, 32.64, 41.38, 42.65, 51.26, 74.01, 77.62. Anal. cald. for $C_{11}H_{20}O_2$: C, 71.69, H, 10.94. Found: C, 71.49, H, 10.80.

Compound 3a: colourless oil. **IR:** 1721 cm^{-1}. **^{1}H NMR** (δ): 0.83 (s, 3H), 0.88 (s, 3H), 1.31 (s, 3H), 2.16 (s, 3H), 2.65 (m, 2H), 2.93 (br s, 1H). **^{13}C NMR** (δ): 21.47, 21.99, 26.68, 26.90, 27.21, 27.62, 29.79, 31.48, 42.98, 46.17, 59.04, 59.94, 208.83. ***m/z*(EI):** 210 (1, M^+), 195 (6), 163 (4), 149 (12), 121 (9), 95 (21), 81 (25), 69 (41), 55 (100). Anal. calcd. for $C_{13}H_{22}O_2$: C, 74.24, H, 10.34. Found: C, 74.47, H, 10.22.

Compound 11a: **IR:** 3391, 1055 cm^{-1}. **^{1}H NMR** (δ): 0.84 (s, 3H), 0.86 (s, 3H), 0.88 (s, 3H), 1.37 (s, 3H), 3.89 (m, 1H). **^{13}C NMR** (δ): 10.88, 19.87, 21.19, 26.16, 28.47, 32.72, 32.90, 37.08, 40.30, 50.88, 51.39, 73.14, 82.63. Anal. cald. for $C_{13}H_{24}O_2$: C, 73.54, H, 11.39. Found: C, 73.36, H, 11.47.

Compound 11a$_1$: **IR:** 3391, 1055 cm^{-1}. **^{1}H NMR** (δ): 0.82 (s, 3H), 0.90 (s, 3H), 1.00 (s, 3H), 1.35 (s, 3H), 3.66 (m, 1H). **^{13}C NMR** (δ): 8.80, 20.75, 21.10, 25.52, 29.50, 32.49, 32.65, 37.99, 40.26, 49.47, 51.54, 74.77, 81.92. ***m/z*(EI)**: 212 (1, M^+), 194 (4), 176 (17), 136 (98), 121 (56), 109 (51), 95 (81), 81 (43), 71 (45), 55 (100). Anal. cald. for $C_{13}H_{24}O_2$: C, 73.54, H, 11.39. Found: C, 73.41, H, 11.50.

Compound 3b: colourless oil. **IR:** 1724 cm^{-1}. **^{1}H NMR** (δ): 0.82 (s, 3H), 0.88 (s, 3H), 1.31 (s, 3H), 2.65 (m, 2H), 2.93 (br s, 1H), 9.79 (br s, 1H). **^{13}C NMR** (δ): 19.67, 21.88, 26.50, 26.73, 27.10, 27.57, 31.41, 43.18, 46.10, 58.84, 59.78, 202.47. ***m/z*(EI):** 196 (1, M^+), 181 (2), 149 (7), 125 (15), 111 (6), 97 (14), 81 (21), 69 (39), 55 (100). Anal. calcd. for $C_{12}H_{20}O_2$: C, 73.43, H, 10.27. Found: C, 73.19, H, 10.35.

Compound 11b: yellow oil. **IR:** 3391, 1049 cm^{-1}. **^{1}H NMR** (δ): 0.80 (s, 3H), 0.82 (s, 3H), 1.11 (s, 3H), 3.67 (dd, J=9.6, 7.5 Hz, 1H), 4.49 (dd, J=9.4, 7.5 Hz, 1H). **^{13}C NMR** (δ): 21.71, 22.40, 23.15, 27.54, 30.30, 32.37, 32.45, 37.98, 48.41, 55.43, 74.28, 78.04. Anal. cald. for $C_{12}H_{22}O_2$: C, 72.68, H, 11.18. Found: C, 72.80, H, 11.31.

Compound $11b_1$: white solid m.p.=110-120ºC. **IR:** 3318, 1032 cm^{-1}. **^{1}H NMR** (δ): 0.76 (s, 3H), 0.86 (s, 3H), 0.88 (s, 3H), 3.83 (dd, J=9.1, 6.9 Hz, 1H), 3.85 (d, J=6 Hz, 1H). **^{13}C NMR** (δ): 13.26, 21.03, 21.10, 28.30, 30.71, 32.31, 32.52, 40.29, 49.92, 49.98, 72.38, 79.00. ***m/z*(EI)**: 198 (2, M^+), 180 (7), 165 (17), 149 (25), 136 (100), 121 (36), 93 (28), 81 (77), 69 (34), 55 (73). Anal. cald. for $C_{12}H_{22}O_2$: C, 72.68, H, 11.18. Found: C, 72.54, H, 11.32.

Compound 7: colourless oil. **IR:** 1740, 1242, 1040 cm^{-1}. **^{1}H NMR** (δ): 0.80 (s, 3H), 0.88 (s, 3H), 1.32 (s, 3H), 2.04 (s, 3H), 2.93 (br s, 1H), 4.07 (t, J=6.6 Hz, 2H). **^{13}C NMR** (δ): 20.85, 21.92, 23.56, 26.70(2), 27.21, 27.57, 28.28, 31.31, 46.70, 59.55, 60.02, 64.94, 163.94. ***m/z*(EI):** 240 (2, M^+), 225 (70), 165 (15), 153 (31), 125 (19), 97 (100), 81 (82), 67 (51), 55 (96). Anal. calcd. for $C_{14}H_{24}O_3$: C, 69.96, H, 10.06. Found: C, 70.11, H, 9.81.

Compound 16: colourless oil. **IR**: 3435, 1738, 1242, 1038 cm^{-1}. **^{1}H NMR** (δ): 0.69 (s, 3H), 0.95 (s,3H), 2.04 (s, 3H), 4.03 (m, 3H), 4.69 (s, 1H), 5.18 (s, 1H). **^{13}C NMR** (δ): 20.81(2), 21.91, 27.33, 29.32, 33.16, 35.64, 38.15, 51.39, 64.61, 73.59, 105.19, 150.42, 171.00. ***m/z*(EI):** 240 (1, M^+), 180 (1), 149 (12), 139 (34), 124 (35), 111 (29), 93 (34), 81 (38), 55 (100). Anal. cald. for $C_{14}H_{24}O_3$: C, 69.96, H, 10.06. Found: C, 69.77, H, 10.19.

Compound 8: colourless oil. **IR:** 3418, 1057 cm^{-1}. **^{1}H NMR** (δ): 0.79 (s, 3H), 0.86 (s, 3H), 1.35 (s, 3H), 2.95 (br s, 1H), 3.65 (m, 2H). **^{13}C NMR** (δ): 21.92, 23.41, 26.64, 26.76, 27.20, 27.60, 31.29, 32.35, 46.82, 59.85, 60.11, 63.01. Anal. calcd. for $C_{12}H_{22}O_2$: C, 72.68, H, 11.18. Found: C, 72.83, H, 11.03.

Compound 4a: colourless oil. **IR:** 1715 cm^{-1}. **^{1}H NMR** (δ): 0.79 (s, 3H), 0.87 (s, 3H), 1.33 (s, 3H), 2.14 (s, 3H), 2.93 (br s, 1H). **^{13}C NMR** (δ): 22.06, 23.90, 26.76, 26.95, 27.12, 27.34, 27.58, 29.65, 31.38, 44.49,

47.26, 59.52, 60.11, 208.75. ***m/z*(EI):** 224 (5, M^+), 209 (21), 153 (27), 125 (26), 112 (18), 97 (24), 81 (46), 67 (44), 55 (100). Anal. calcd. for $C_{14}H_{24}O_2$: C, 75.95, H, 10.78. Found: C, 75.83, H, 10.91.

Compound 12a: colourless oil. **IR:** 3337 cm^{-1}. **^{1}H NMR** (δ): 0.82 (s, 3H), 0.86 (s, 3H), 0.97 (s, 3H), 1.37 (s, 3H), 3.95 (m, 1H). **^{13}C NMR** (δ): 10.99, 21.44, 21.65, 22.42, 28.40, 29.76, 33.04, 33.36, 37.75, 39.74, 46.00, 46.88, 72.59, 75.35. ***m/z*(EI):** 226 (3, M^+), 208 (6), 190 (18), 152 (45), 139 (43), 109 (66), 94 (82), 84 (73), 69 (71), 55 (100). Anal. calcd. for $C_{14}H_{26}O_2$: C, 74.28, H, 11.57. Found: C, 74.38, H, 11.67.

Compound 12a$_1$: colourless oil. **IR:** 3337 cm^{-1}. **^{1}H NMR** (δ): 0.84 (s, 3H), 0.90 (s, 3H), 0.97 (s, 3H), 1.37 (s, 3H), 3.66 (m, 1H).

Compound 12a$_2$: colourless oil. **IR:** 3447, 1713 cm^{-1}. **^{1}H NMR** (δ): 0.79 (s, 3H), 0.91 (s, 3H), 2.13 (s, 3H), 3.73 (m, 1H), 4.74 (s, 1H), 5.18 (s, 1H). **^{13}C NMR** (δ): 25.73, 28.97, 29.31, 29.81, 30.35, 34.11, 35.01, 38.15, 44.19, 45.30, 71.89, 109.53, 150.36, 209.13. ***m/z*(EI):** 224 (3, M^+), 190 (18), 150 (25), 123 (26), 107 (32), 95 (43), 81 (54), 69 (66), 55 (100). Anal. calcd. for $C_{14}H_{24}O_2$: C, 74.95, H, 10.78. Found: C, 74.75, H, 10.67.

Compound 4b: colourless oil. **IR:** 1724 cm^{-1}. **^{1}H NMR** (δ): 0.79 (s, 3H), 0.88 (s, 3H), 1.34 (s, 3H), 2.44 (m, 2H), 2.94 (br s, 1H), 9.77 (t, J=2 Hz, 1H). **^{13}C NMR** (δ): 22.08(2), 26.89(2), 27.23, 27.33, 27.65, 31.41, 44.63, 47.27, 59.41, 60.15, 202.50. ***m/z*(EI):** 195 (4, M^+-CH_3), 167(20), 149 (36), 125 (22), 109 (21), 95 (24), 81 (52), 69 (55), 55 (100). Anal. calcd. for $C_{13}H_{22}O_2$: C, 74.24, H, 10.54. Found: C, 74.44, H, 10.34.

Compound 12b$_2$: colourless oil. **IR:** 3399, 1034, 1063 cm^{-1}. **^{1}H NMR** (δ): 0.71 (s, 3H), 0.88 (s, 3H), 3.63 (m, 3H), 4.70 (s, 1H), 5.16 (s, 1H). Anal. cald. for $C_{13}H_{24}O_2$: C, 73.53, H, 11.39. Found: C, 73.23, H, 11.29.

Compound 12b: yellow oil. **IR:** 3349, 1067 cm^{-1}. **^{1}H NMR** (δ): 0.83 (s, 6H), 0.96 (s, 3H), 3.47 (dd, J=4.3, 11.4 Hz, 1H), 3.55 (dd, J=4.4, 11.3 Hz, 1H). **^{13}C NMR** (δ): 7.52, 20.66, 21.67, 24.32, 27.24, 30.44, 32.70, 32.79, 39.83, 43.25, 51.03, 81.28, 82.16. ***m/z*(EI):** 212 (11, M^+), 194 (11), 179 (19), 161 (20), 138 (48), 109 (93), 94 (88), 81 (100). Anal. calcd. for $C_{13}H_{24}O_2$: C, 73.53, H, 11.39. Found: C, 73.23, H, 11.29.

Compound 5: colourless oil. **IR:** 1723, 1109 cm^{-1}. **^{1}H NMR** (δ): 1.05-1.90 (5H, m), 2.45 (2H, m), 2.72 (2H, m), 3.12 (2H, m), 9.84 (1H, s). **^{13}C NMR** (δ): 19.27, 23.51, 25.11, 29.43, 47.43, 53.25, 54.91, 201.42

m/z(EI): 140 (5, M^+), 121 (20), 94 (6), 79 (23), 59 (100). Anal. calcd. for $C_8H_{12}O_2$: C 68.55, H, 8.63. Found: C, 68.46, H, 8.70.

Compound 14: yellow oil. **IR:** 1740, 1030 cm^{-1}. **^{1}H NMR** (δ): 2.01 (s, 3H), 2.08 (s, 3H), 5.28 (m, 2H). **^{13}C NMR** (δ): 17.33, 21.04, 21.30, 26.29, 31.02, 33.11, 38.42, 41.49, 75.67, 84.22, 170.44, 171.08. ***m/z*(EI):** 166 (8, M^+-AcO), 138 (2), 124 (55), 106 (42), 95 (43), 80 (38), 67 (23), 43 (100). Anal. calcd. for $C_{12}H_{18}O_4$: C 63.70, H, 8.02. Found: C, 63.63, H, 7.96.

Compound 6: colourless oil. **IR:** 1721, 1167 cm^{-1}. **^{1}H NMR** (δ): 1.25 (s, 3H), 1.28 (s, 3H), 2.15 (s, 3H), 2.59 (t, J=7 Hz, 2H), 2.71 (dd, J=4.6 Hz, 7.9 Hz, 1H). **^{13}C NMR** (δ): 18.56, 22.99, 24.63, 29.69, 40.11, 58.47, 63.17, 207.25. ***m/z*(EI):** 142 (38, M^+), 109 (13), 84 (15), 72 (100), 57 (51), 43 (53). Anal. calcd. for $C_8H_{14}O_2$: C 67.57, H, 9.92. Found: C, 67.61, H, 9.87.

Compound 15a: colourless oil. **IR:** 3381, 1036 cm^{-1}. **^{1}H NMR** (δ): 0.76 (s, 3H), 1.03 (s, 3H), 1.14 (s, 3H), 3.73 (d, J=6 Hz, 1H). **^{13}C NMR** (δ): 15.85, 21.51, 23.84, 30.75, 37.88, 48.20, 82.89, 83.30. ***m/z*(EI):** 126 (14, M^+-H_2O), 11 (59), 93 (71), 69 (80), 55 (89), 43 (100). Anal. calcd. for $C_8H_{16}O_2$: C 66.63, H, 11.18. Found: C, 66.71, H, 11.22.

Compound 15b: white solid m.p.=85º-98ºC. **IR:** 3391, 1055 cm^{-1}. **^{1}H NMR** (δ): 0.77 (s, 3H), 0.95 (s, 3H), 1.17 (s, 3H), 4.17 (t, J=8.5 Hz, 1H). **^{13}C NMR** (δ): 17.43, 18.85, 23.37, 29.03, 35.97, 47.35, 79.43, 81.78. ***m/z*(EI):** 126 (13, M^+-H_2O), 108 (92), 93 (40), 83 (39), 71 (100), 55 (55). Anal. calcd. for $C_8H_{16}O_2$: C 66.63, H, 11.18. Found: C, 66.59, H, 11.23.

Compound 17: colourless oil. **IR:** 3341, 1462 cm^{-1}. **^{1}H NMR** (δ): 0.82 (s, 3H), 0.85 (s, 3H), 0.87 (d, J=7.4 Hz, 3H), 3.64 (m, 3H). **^{13}C NMR** (δ): 8.31, 22.79(2), 26.63, 31.26, 31.76, 33.15, 35.66(2),47.79, 63.11, 74.13. ***m/z*(EI):** 182 (1, M^+-H_2O), 167 (4), 139 (8), 111 (10), 95 (25), 81 (30), 67 (47), 55(100). Anal. cald. for $C_{12}H_{24}O_2$: C, 71.95, H, 12.07. Found: C, 71.68, H, 12.21.

Compound 18: yellow oil. **IR:** 3422, 1717 cm^{-1}. **^{1}H NMR** (δ): 0.85 (s, 3H), 0.87 (d, J=7.3 Hz, 3H), 0.88 (s, 3H), 2.15 (s, 3H), 3.63 (dt, J=5 Hz, 10 Hz, 1H). **^{13}C NMR** (δ): 20.78, 22.82, 26.61, 29.64, 29.87, 30.27, 31.73, 33.15, 35.49, 42.14, 47.18, 73.94, 209.27. **m/z(EI):** 194 (2, M^+-H_2O), 176 (10), 161 (9), 136 (62), 121 (54), 95 (54), 81 (50), 55 (62), 43 (100). Anal. calcd. for $C_{13}H_{24}O_2$: C 73.54, H, 11.39. Found: C, 73.46, H, 11.42.